



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/520,480	06/21/2005	Mark Bernard Denys	APV31847	5517
77213	7590	06/23/2008		
Novak Druce + Quigg, LLP 1300 Eye Street, NW, Suite 1000 Suite 1000, West Tower Washington, DC 20005			EXAMINER	
			FOGARTY, CAITLIN ANNE	
			ART UNIT	PAPER NUMBER
			1793	
			MAIL DATE	DELIVERY MODE
			06/23/2008	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

**Application No.**

10/520,480

**Applicant(s)**

DENYS ET AL.

**Examiner**

CAITLIN FOGARTY

**Art Unit**

1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 March 2008.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,3 and 5-23 is/are pending in the application.  
4a) Of the above claim(s) 18-23 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1,3,5-17 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 12 March 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO/S508)  
Paper No(s)/Mail Date \_\_\_\_\_  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Status of Claims***

1. Claims 1, 3, and 5 – 23 are pending where claims 1, 5, 6, and 8 have been amended. Claims 18 – 23 have been withdrawn as a result of a restriction requirement. Claims 2 and 4 have been cancelled.

### ***Status of Previous Rejections***

2. The objection to the drawings has been withdrawn in view of the amendment filed March 12, 2008.

3. The following rejections have been withdrawn in view of the amendment filed March 12, 2008:

- Claims 1 – 11 and 16 – 17 under 35 U.S.C. 102(b) as being anticipated by Klaassen et al. (US 5,662,860).
- Claims 12 – 14 under 35 U.S.C. 103(a) as being unpatentable over Klaassen et al. (US 5,662,860)
- Claim 15 under 35 U.S.C. 103(a) as being unpatentable over Klaassen et al. (US 5,662,860) in view of Beggs et al. (US 4,248,408).

### ***Means Plus Function Language***

4. The means plus function language appearing in the instant claims has been interpreted as follows:

- “means for emitting a plurality of jets of oxygen” (Claim 1) as exemplified in Fig. 5 in the instant application.

***Claim Objections***

5. Claim 13 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 1 recites that the lance arrangement comprises at least three lances. However, claim 13 recites "wherein the at least two lances..." which is broader than the independent claim 1. Therefore, claim 13 does not further limit the independent claim 1.

***Claim Rejections - 35 USC § 103***

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 1, 3, 5 – 12, 16 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Klaassen et al. (US 5,662,860) in view of Nishikawa et al. (US 5,769,923).

With respect to instant claim 1, the abstract, Fig. 2, col. 2 lines 36 – 46, and col. 3 lines 35 – 62 of Klaassen et al. disclose a metallurgical vessel for iron making comprising a bottom portion, a sidewall and a lance arrangement (23) of a plurality of lances for supplying oxygen gas to the interior of the vessel in operation. Each lance comprises an end portion for emitting oxygen gas and the lances project into the upper portion of the vessel as seen in Fig. 2. Furthermore, at least one lance is arranged for directing the oxygen gas towards a central axis of the metallurgical vessel as seen in Fig. 2. Klaassen et al. discloses that the metallurgical vessel has a plurality of lances

which includes the limitation of claim 1 of at least three lances. Klaassen et al. does not specifically teach that the lance arrangement in operation achieves a substantially downwardly directed flow of post-combusted gases at the side wall of the vessel and a substantially upwardly directed flow of post-combusted gases in the center of the vessel. However, since the lances in the metallurgical vessel of Klaassen et al. are arranged in a similar manner as the lances of the instant application, the lances of Klaassen et al. would be capable of directing the post-combusted gases in the same manner. A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). See MPEP 2114.

Klaassen et al. differs from instant claim 1 because it does not teach that at least one of the lances is provided with a means for emitting a plurality of jets of oxygen containing gas from its end portion. However, col. 2 line 47 to col. 3 line 9, and Figs. 1 and 2 of Nishikawa et al. teach a process for decarburization refining of molten ferrous metal containing chromium comprising blowing gaseous oxygen onto or into the molten metal with a top blowing lance having a plurality of gas blowing nozzles at the tip of the lance. It would have been obvious to one of ordinary skill in the art to incorporate the plurality of oxygen gas blowing nozzles as taught by Nishikawa et al. into one or more of the lances of the metallurgical vessel of Klaassen in order to increase the surface area

of molten metal reached by the oxygen (see col. 2 line 47 to col. 3 line 9 of Nishikawa et al.).

In regards to instant claim 3, Fig. 2 of Klaassen et al. shows that at least one of the lances projects through a roof portion of the metallurgical vessel.

Regarding instant claim 5, Fig. 2 of Klaassen et al. shows that at least one of the lances is inclined from the vertical under a first acute angle with its end portion inclined towards the central axis of the metallurgical vessel.

With respect to instant claim 6, col. 3 lines 54 – 59 of Klaassen et al. disclose that part 20 in Fig. 2 can have an enlarge cross-section to make it possible to position the lances more vertically. Therefore, by changing the cross-section of part 20, it would be possible for the metallurgical vessel to have an end portion of the lance configured to direct the oxygen containing gas towards the central axis of the metallurgical vessel under a second acute angle from the vertical where the second acute angle is greater than the first acute angle.

In regards to instant claim 7, Fig. 2 of Klaassen et al. shows that the end portions of the metallurgical lances are all of equal distance from the sidewall.

Klaassen et al. differs from instant claim 8 because it does not specifically disclose that at least one of the lances is adjustable in height. However, col. 3 lines 52 to 62 of Klaassen et al. teach that the position of the lances may be adjusted so they are more vertical. Therefore, it would have been obvious to one of ordinary skill in the art that the lances of Klaassen et al. would be capable of being adjustable in height as long as they remain above the slag layer since the position of the lances is adjustable.

Regarding instant claim 9, Fig. 2, col. 2 lines 47 – 60, and col. 3 lines 52 – 54 of Klaassen et al. disclose a metallurgical vessel where particulate material is added to the vessel through at least one feed chute (22). Klaassen et al. does not specifically teach that the particulate material goes through the feed chute in the substantially downwardly directed flow of post-combusted gases. However, since the feed chute of the metallurgical vessel of Klaassen et al. is positioned in the downward direction, it would be capable of directing the particulate material in the same manner. A claim containing a “recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus” if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). See MPEP 2114.

With respect to instant claims 10 and 11, Fig. 2, col. 2 lines 47 – 60, and col. 3 lines 52 – 54 of Klaassen et al. teach that the means for supplying coal comprises at least one lance that projects through a roof portion of the vessel. Thus, the metallurgical vessel of Klaassen et al. may have a plurality of feed chutes that project through a roof portion of the vessel and also each lance may have a corresponding feed chute.

Klaassen et al. differs from instant claim 12 because it does not specifically teach that each feed chute is positioned between the lance and the sidewall of the metallurgical vessel in a radial direction. However, the orientation of the feed chute and the lance of Klaassen et al. as seen in Fig. 2 is a functional equivalent of that of the vessel of the instant application because the feed chute and the lance of Klaassen et al.

are oriented in the same direction as those of the instant application and therefore would perform the same function as those of the instant application. See MPEP 2144.06.

Regarding instant claim 16, Fig. 2, col. 2 lines 10 – 16, and col. 3 line 63 to col. 4 line 3 of Klaassen et al. teach that the metallurgical vessel comprises a melting cyclone (12) mounted directly above and in direct open communication with the vessel.

With respect to instant claim 17, Fig. 2 and col. 2 lines 36 – 46 of Klaassen et al. teach a metallurgical vessel wherein the lances are positioned to avoid contact with molten material passing downwards from the melting cyclone to the metallurgical vessel.

8. Claims 13 – 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Klaassen et al. (US 5,662,860) in view of Nishikawa et al. (US 5,769,923) as applied to claim 1 above, and further in view of Geiger et al. (US 5,733,358).

Klaassen et al. in view of Nishikawa et al. is applied to instant claim 1 as discussed above.

In regards to instant claims 13 and 15, Fig. 2, col. 2 lines 36 – 46, and col. 3 lines 35 - 62 of Klaassen et al. disclose that the sidewall comprises a lower portion for accommodating a molten metal bath and a slag layer and an upper portion for accommodating a slag layer as seen in Fig. 2. However, the contents of the metallurgical vessel is an intended use and is not treated as a claim limitation because it does not further limit the structure of the metallurgical vessel. See MPEP 2111.02. Klaassen et al. also teaches that the vessel has a plurality of lances (which includes at



least two lances) for supplying oxygen gas to the upper portion of the vessel that project into the upper portion of the vessel.

Klaassen et al. differs from claim 13 because it does not teach that the sidewall comprises a plurality of tuyeres for supplying gas and/or liquid and/or solids and/or plasma into the slag layer in the lower portion of the vessel are arranged around the circumference of the lower portion of the vessel. Klaassen et al. differs from instant claim 15 because it does not teach that the tuyeres comprise oxy-fuel burners. However, col. 4 lines 19 – 65, col. 19 lines 14 – 25, and Fig. 5 of Geiger et al. disclose an improvement in the process of steelmaking from iron carbide in a steelmaking furnace. The side wall of the metallurgical vessel of Geiger et al. comprises a burner (19) that can burn natural gas and a natural gas/oxygen burner (12). Therefore, the tuyeres of Geiger et al. would be capable of burning oxy-fuel. It would have been obvious to one of ordinary skill in the art to incorporate the tuyeres of Geiger et al. in the lower portion of the metallurgical vessel of Klaassen et al. in view of Nishikawa et al. because the burners could be used to supply extra heat, as needed, and to heat or melt scrap or to heat the vessel on start-up (see col. 5 line 64 to col. 6 line 23 of Geiger et al.).

With respect to instant claim 14, Fig. 2 of Klaassen et al. shows that the diameter of the lower portion of the vessel is smaller than that of the upper portion.

***Response to Arguments***

9. Applicant's arguments directed to the remaining relevant reference, Klaassen et al., filed March 12, 2008 have been fully considered but they are not persuasive.

Arguments are summarized as follows:

- a. Klaassen et al. teaches away from the present invention because it states that the lances are oriented as vertically as possible to achieve the same effect as that of one central lance. Also, Klaassen et al. implies that the post-combusted gases flow from their lower generation zone in upward direction along the side wall of the vessel to allow the heat to be absorbed which is contrary to the teaching of the present invention. Furthermore, Fig. 2 of Klaassen et al. shows the ends of the lances extend into the foaming slag which would prevent the generation of a direction controlled flow of post-combusted gases according to the claimed invention.
- b. Klaassen et al. does not disclose, either explicitly or implicitly, at least one lance comprising means for emitting a plurality of jets.
- c. Klaassen et al. does not disclose or suggest a height adjustable lance.

Examiner's responses are as follows:

- a. The lances of Klaassen et al. are oriented in the same manner as those of the instant invention to direct oxygen gas towards a central axis of the metallurgical vessel as seen in Fig. 2. The embodiment of a single central lance disclosed by Klaassen et al. is one embodiment of Klaassen et al. and is not

relied upon in this rejection. Also, the metallurgical vessel of Klaassen et al. would be capable of directing the post-combusted gases in the direction claimed in the instant invention as discussed above in the 35 U.S.C. 103(a) rejection. Lastly, the lances of Klaassen et al. are positioned to extend above the slag layer (col. 3 lines 54 – 57) and therefore would not prevent flow of the post-combusted gases.

- b. See the 35 U.S.C. 103(a) rejection above.
- c. See the 35 U.S.C. 103(a) rejection above.

#### ***Conclusion***

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CAITLIN FOGARTY whose telephone number is (571)270-3589. The examiner can normally be reached on Monday - Friday 8:00 AM - 5:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roy King/  
Supervisory Patent Examiner, Art  
Unit 1793

CF